

# The effect of electron-ion collisionality on ETG turbulence

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In electrostatic simulations of MAST plasma at electron-gyroradius scales, using the local flux-tube gyrokinetic code GS2 with adiabatic ions, we find that the long-time saturated electron heat flux (the level most relevant to energy transport) decreases as the electron collisionality decreases. At early simulation times the heat flux quasi-saturates at a level independent of electron collisionality; however the zonal fluctuation component continues to grow slowly until much later times, eventually reducing the heat flux at low collisionality. We outline an explanation of this effect based on zonal-nonzonal interactions and the scaling of the zonal damping rate with electron-ion collisionality.

Improved energy confinement with decreasing collisionality has previously been observed on NSTX and MAST, and is favourable towards the performance of future devices.

This work was part-funded by the RCUK Energy Programme under grant EP/I501045, and by the European Union's Horizon 2020 research and innovation programme under grant agreement number 210130335. Computations were performed at the UK's HECToR service under EPSRC grant EP/H002081/1, on EFDA's HPCFF system, and on the Helios system at IFERC-CSC.

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